

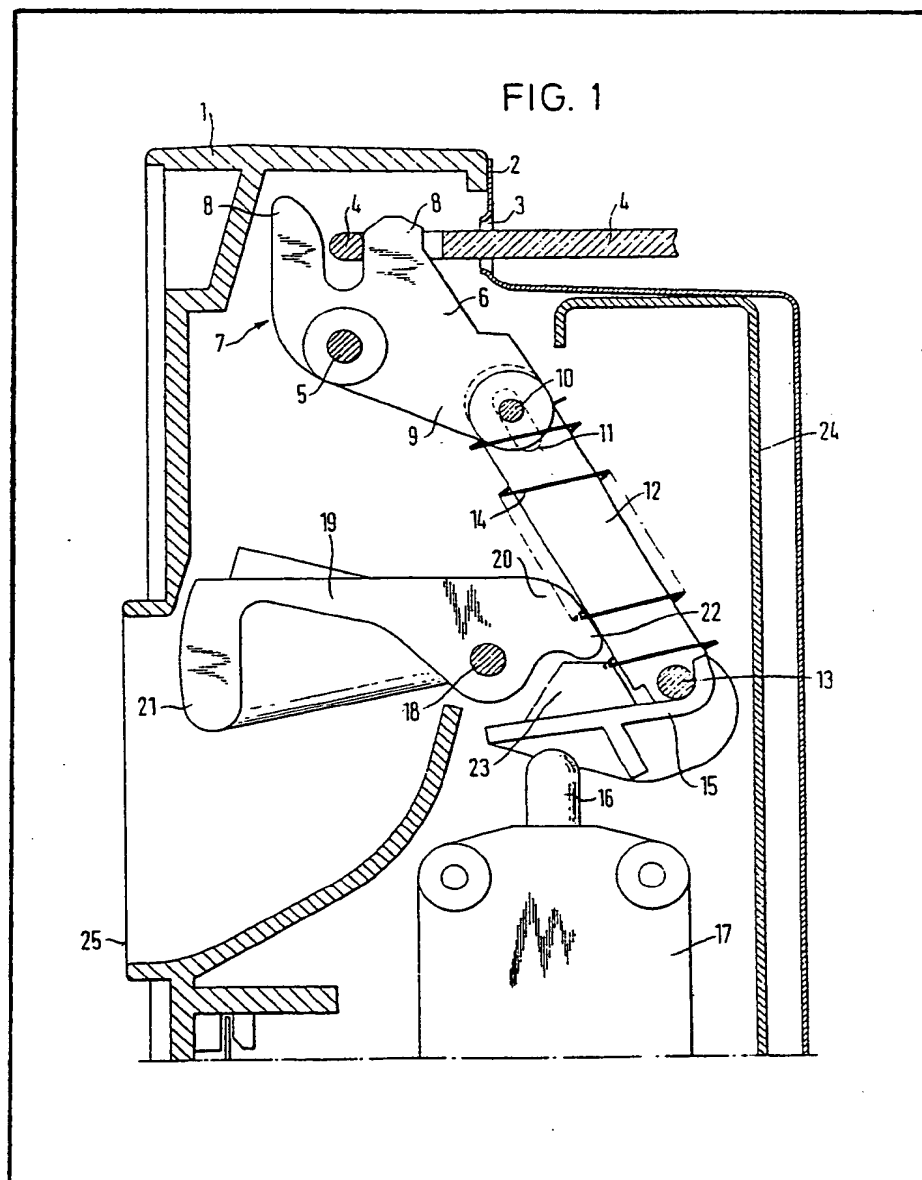
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(54) Door Latch

(57) A latch comprises a pivoted bifurcated bolt (7), with a rod (12) pivoted to its via pin-and-slot (10, 11); this rod having a fixed pivot (13) at its other end, spring (14) surrounds the

rod to give an over-centre mechanism. The latch is rendered easier to undo from keeper (4) by provision of a lever (19) with grip (21) to reduce the force that must be applied manually to break the toggle. Microswitch 17 cuts off power to the machine when the door is open.



GB 2 133 455 A

FIG. 1

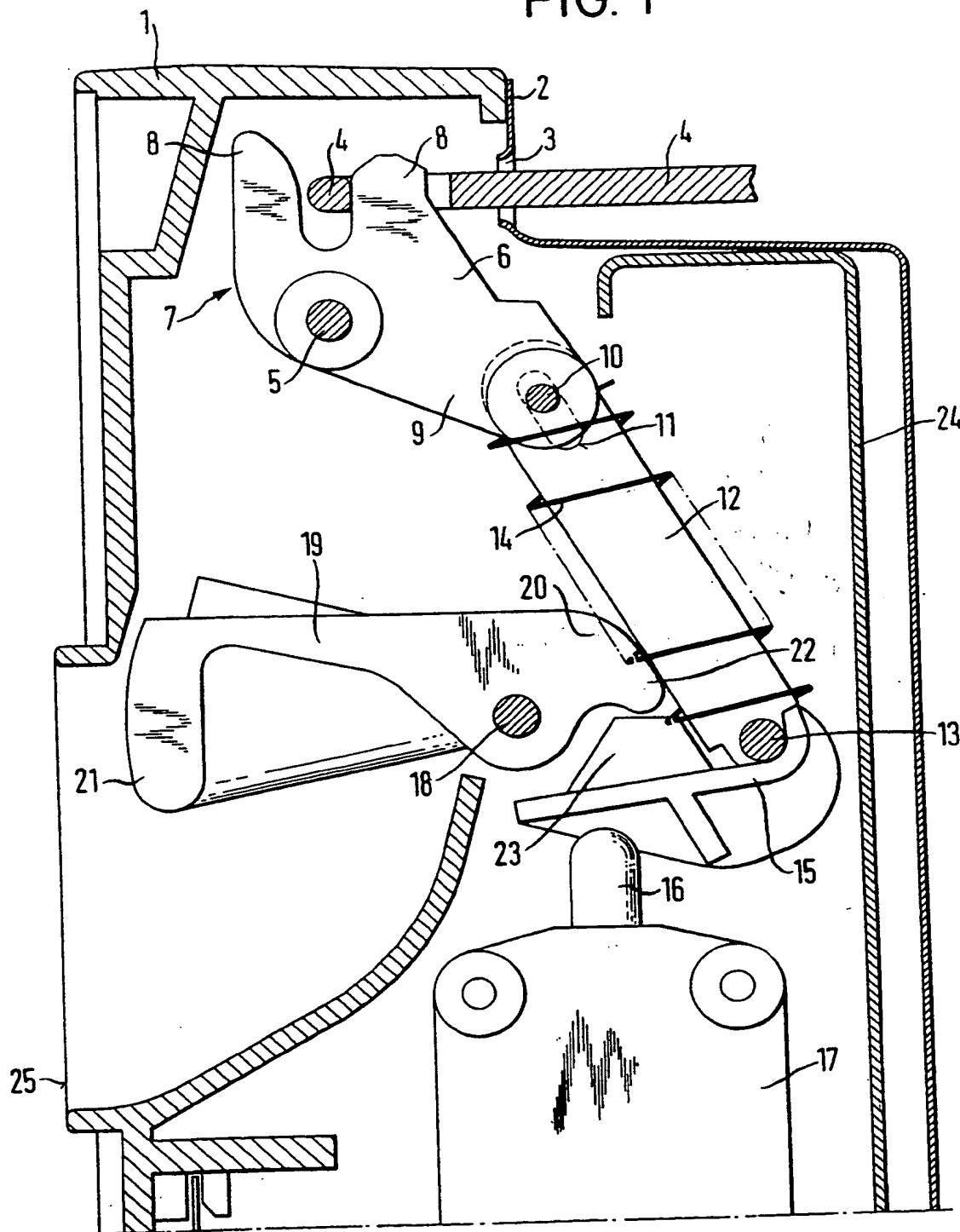
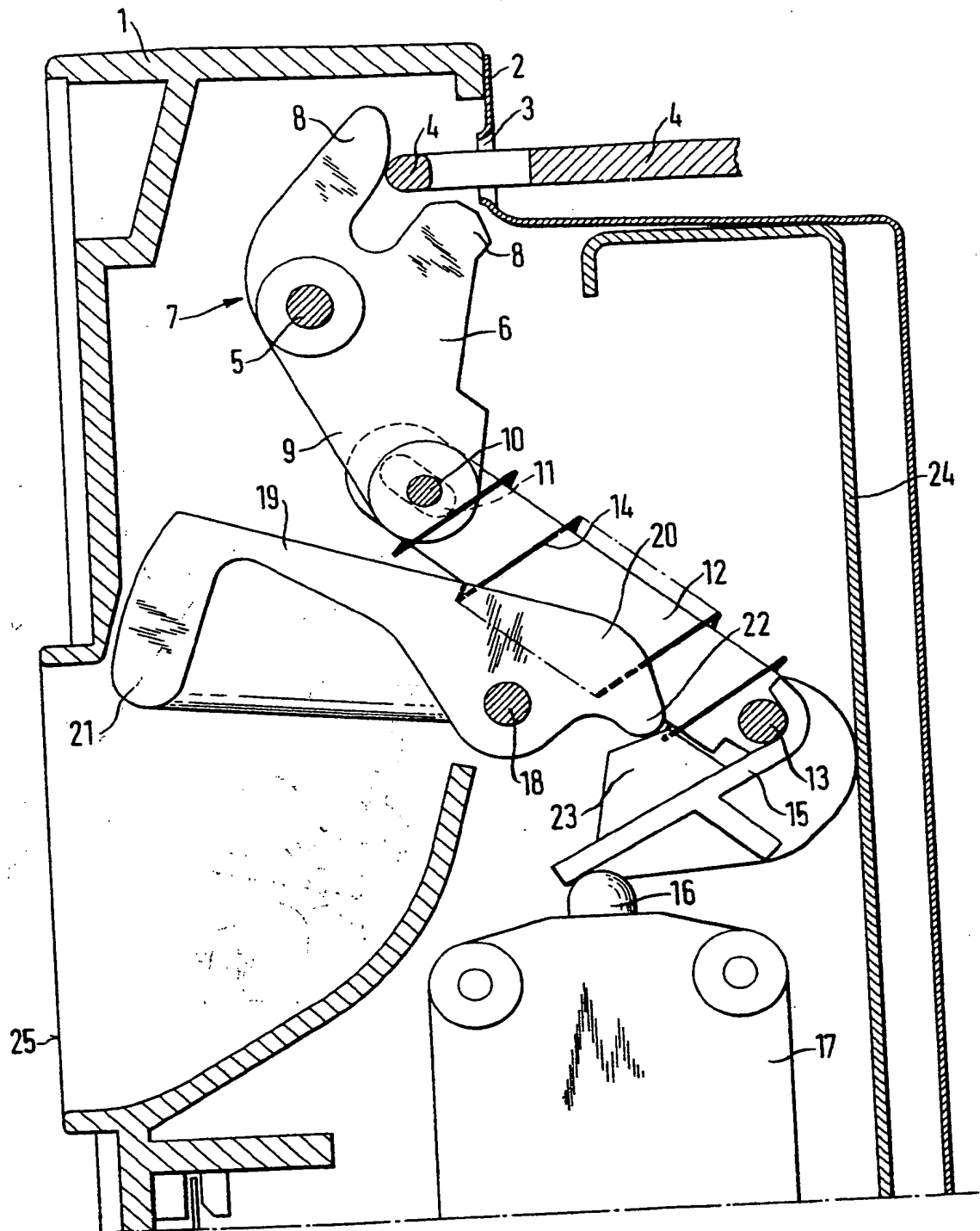


FIG. 2



## SPECIFICATION

### Door latch

The present invention relates to a door latch, especially a latch for the door of an electrical domestic appliance.

A known door latch (DE—OS 28 26 712) is designed as pull-open closure which holds the closed door with a bias against a door seal. For opening of the door, an operator must exert substantial pulling force at a grip hollow of the door panel or a grip on the outside wall of the door in order to move a fork catch into an open setting while over-centring a toggle joint relative to a stationary locking bar of the appliance housing. Positive action pull-open door latches of this kind are therefore difficult to open and close.

In addition, a pull-open closure with an actuating grip is disclosed in DE—OS 16 28 505. For the closing and opening of the door, the closure is actuated solely through pressing of the door against the housing or through pulling the door away from the housing. For this purpose, the door has a fixed grip at its front side. An additional actuating grip serves for the actuation of an interrupter switch in the current circuit of a circulating pump of a dishwashing machine provided with the door closure.

A door latch is also known from DE—AS 17 60 544 for a loading door, provided with an all-round seal, of a washing machine or dishwashing machine, the latch having a toggle joint device arranged in the door housing for the actuation of a locking bar, a safety switch to preclude switching-on of the machine in the opened state of the door, and a blocking bolt, which is arranged at the door housing and which on the closing of the door abuts an abutment at the machine housing and is therefore moved into its unlocking setting. With the door opened, the bolt blocks the locking bar. In this complicated door closure, a press-on angle lever articulated at the door housing is pushable at a free end thereof, by means of an actuating grip by way of the toggle joint device, over a ramp surface mounted at the machine housing while over-centring the toggle joint and the safety switch is actuated by the toggle joint device when the over-centring takes place.

It would be desirable, however, for a pull-open door latch of this type to be more easily actuable.

According to the present invention there is provided a door latch comprising a catch having a forked end portion and being pivotable about a first axis between a closed and an open position for disposition of the forked end portion respectively in and out of engagement with a latching member, a rod pivotable about a second axis spaced from the catch and operatively coupled to the catch to form a toggle joint therewith, a spring mounted on the rod and acting on the catch to provide overcentre snap action of the joint, and an actuating lever having a grip portion and an actuating portion and being pivotable by the grip portion about a third axis to

cause the actuating portion to exert such a pressure on the rod during pivotal movement of the catch into its open position as to increase the force acting on the catch for overcentre movement of the joint.

A door latch with these features may represent a relatively simple pull-open door closure and enable considerably easier opening of the door.

Preferably, the entire mechanism of the latch is pre-assembled in a respective housing of, for example, plastics material and insertable as fully operational component into a carrier plate of a door, particularly the inner door element of a two-element appliance door. In addition, a switch can be pre-mounted at the lock housing so that adjustment between the latch parts and the switch is not required during the installation of the latch.

An embodiment of the present invention will now be more particularly described by way of example with reference to the accompanying drawings, in which:

Fig. 1 is a sectional elevation of a household appliance door fitted with a latch embodying the present invention, the latch being shown in its setting with the door closed; and

Fig. 2 is a view similar to Fig. 1 but showing the latch in its setting with the door open.

Referring now to the drawings, there is shown a door latch arranged in a shield box 1 in the region of the upper rim of a door 2 at the front side of a household appliance. A stationary locking bar 4, which is fastened to a housing (not shown) of the appliance, can enter into the shield box through an opening 3 in an inside metal plate of the door. Through movement of the door into an open setting (Fig. 2) or a close setting (Fig. 1), a fork catch 7, which is mounted at its middle position 6 to be pivotable about a horizontally extending, stationary axle 5, is so turned through the engagement of the locking bar 4 in the mouth or, with the fork-shaped end portion 8 of the catch that the catch assumes an end position corresponding to the door setting.

An end portion 9, at the side of the door, of the catch 7 carries a hinge pin 10, which is guided in a slot 11 of a thrust rod 12. The rod is provided in its lower end—remote from the end portion 9—with a bore in which a stationary bolt 13 is guided, the rod being pivotable about the bolt 13. Mounted on the rod 12 is a compression spring 14, which bears at one end against the bolt 13 and at the other end against the end portion 9 or the hinge pin 10.

Provided at the lower end of the rod 12 is a rigid projection 15, which is pivotable around the bolt 13 and which serves for the actuation of the pushrod 16 of a switch 17 disposed in the appliance in such a manner that the electrical circuit thereof is interrupted when the catch 7 is pivoted into the open setting (Fig. 2).

Pivotably mounted on a fixed axle 18 is an actuating lever 19 having a grip 21 and a lever arm 20 remote from the grip, the grip being

2

plugged onto the lever. The arm 20 has an entraining member 22 which, on raising of the grip 21, is pressed against an abutment 23 of the projection 15 and the rod 12 is thereby pivotable around the axle 18 out of the position shown in Fig. 1 into the position according to Fig. 2 for the opening of the door. In that case, the fixed axle 5 of the catch 7, the end portion 9 of the catch at the inside of the door, the hinge pin 10 of the catch, the slot 11, the rod 12 with the compression spring 14 and the locally fixed bolt 13 form a toggle joint. All the components of the latch can be pre-assembled in a housing (not shown) which is fastenable within the shield box 1 at a carrier plate 24 of the door 2 or of the inside metal plate of the door. The grip 21, which is plugable onto the lever 19 and adaptable in its length to the depth of the shield, is actuatable through an opening 25 in the shield box 1.

If the door is in closed position (position according to Fig. 1) and is to be opened, the operator engages the grip 21 through the opening 25 and raises the lever 19 during a forcible pull-open movement so that the entraining member 22 presses against the abutment 23 of the projection 15. The projection 15, which is connected as a rigid lever with the rod 12, turns the rod 12 in counterclockwise sense around the axis formed by the bolt 13 until the toggle joint after overcentring assumes the end position shown in Fig. 2 by reason of the stressed compression spring 14. A restoring spring (not shown) moves the actuating lever into its initial position after the release of the grip 21.

The tension force, which results from the pull-open movement and acts on the catch 7, exerts a turning moment on the catch which, together with the force acting at the actuating lever, effects opening of the latch. A jerky pulling-open of the door can be avoided through the force acting additionally through the actuating lever. At the same time, the switch 17, which can be pre-assembled in the latch housing and therefore does not need to be adjusted, is actuated by way of the projection 15 during opening of the door.

During closing of the door, the mouth of the catch 7 moves against the fixed locking bar 4 and the catch is thereby turned in counterclockwise sense around its bearing axle 5 and sets the toggle joint back into the closed setting (Fig. 1).

#### Claims

1. A door latch comprising a catch having a forked end portion and being pivotable about a first axis between a closed and an open position for disposition of the forked end portion respectively in and out of engagement with a latching member, a rod pivotable about a second axis spaced from the catch and operatively coupled to the catch to form a toggle joint therewith, a spring mounted on the rod and acting on the catch to provide overcentre snap action of the joint, and an actuating lever having a grip portion and an actuating portion and being pivotable by the grip portion about a third axis to

cause the actuating portion to exert such a pressure on the rod during pivotal movement of the catch into its open position as to increase the force acting on the catch for overcentre movement of the joint.

2. A door latch as claimed in claim 1, wherein the second axis is defined by a fixed axle pin and the spring is arranged to bear at one end on the pin and at the other end on the catch.

3. A door latch as claimed in claim 2, wherein the rod is operatively coupled to the catch by means of a coupling pin arranged at a lower end portion of the catch remote from the forked end portion and slidably engaged in a slot in an upper end portion of the rod, the rod being provided in a lower end portion thereof with a bore receiving the axle pin.

4. A door latch as claimed in any one of the preceding claims, comprising housing receiving the rod, the spring, the catch and the lever apart from said forked end portion and said grip portion, the first, second and third axes being defined by axle pins carried by the housing, and the housing being mountable on an a mounting plate in a door.

5. A door latch as claimed in any one of the preceding claims, wherein the rod is provided with a projection for actuating a switch on pivotal movement of the catch into its open position.

6. A door latch as claimed in claim 5, wherein the actuating portion of the lever comprises entraining elements engageable with an abutment on the projection to enable exertion on the rod of pressure tending to pivot the rod about the second axis thereby to provide said increase in force.

7. A door latch as claimed in either claim 5 or claim 6 when appended to claim 4, comprising a switch mounted on the housing in such a defined position relative to the rod as to be actuatable by the projection on pivotal movement of the catch into its open position.

8. A door latch as claimed in any one of the preceding claims, wherein the lever is provided at its grip portion with a grip element plugged onto the lever.

9. A door latch substantially as hereinbefore described with reference to the accompanying drawings.

10. A door provided with a latch as claimed in any one of the preceding claims, the latch being mounted within the door and the grip portion being accessible by way of a recess in the door.

11. A door as claimed in claim 10, wherein the latch is as claimed in claim 8 and the grip element is selected to have a depth dependent on the depth of the door.

12. A door as claimed in claim 10 and substantially as hereinbefore described with reference to the accompanying drawings.

13. A domestic appliance comprising a housing and a door as claimed in any one of claims 10 to 12 for opening and closing the housing, the housing being provided with said latching member.

14. An appliance as claimed in claim 13,  
wherein the latch is as claimed in claim 7 and the  
switch is connected to circuit means of the

5 appliance to interrupt current flow therein when  
the switch is actuated by the projection.

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